

Remarks:

Reconsideration of the application is respectfully requested in view of the foregoing amendments and following remarks.

Cited Art

U.S. Patent No. 4,581,712 to Perry et al. ("Perry") is entitled "roof pressure monitoring system."

U.S. Patent No. 4,710,064 to Stafford et al. ("Stafford") is entitled "movable roof support and bolter system."

U.S. Patent No. 4,604,706 to Fisher, Jr. et al. ("Fisher") is entitled "apparatus for failure predication of earth structures."

U.S. Patent No. 5,542,788 to Stankus et al. ("Stankus") is entitled "method and apparatus for monitoring mine roof support systems."

U.S. Patent No. 4,480,480 to Scott et al. ("Scott") is entitled "system for assessing the integrity of structural systems."

U.S. Patent No. 4,979,780 to Marion ("Marion") is entitled "mining or underground quarrying method and installation for implementing same."

Overview

Applicants respectfully submit that the cited references do not teach all the limitations recited in the pending claims. Moreover, Applicants respectfully point out that the cited references plainly lack sufficient suggestion or motivation to combine or modify the technologies to result in the claimed arrangements. Applicants request a telephonic Examiner interview if the Examiner disagrees after reading the below remarks.

Patentability of Claims over Perry-Stafford-Fisher-Stankus under § 103

The Action rejects claims 1-3, 6-8, 11-13, 15-17, 19, 21-25, 27, 29-38, and 43 under 35 U.S.C. § 103(a) as being unpatentable over Perry in view of Stafford, Fisher, and Stankus. Applicants disagree.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, *either in the references themselves or in the*

knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. (MPEP § 2142.)

Claim 1

Claim 1 has been amended to recite in part:

wherein the plurality of sensory indicators located in the vicinity of said at least one load sensing device indicate loading rate for the mobile roof support unit on a real-time basis during mining operations as determined via the pressure change information for the one or more hydraulic support systems of the mobile roof support machine . . .

For example, the Application at page 5, lines 14-25 reads:

The apparatus 10 uses a dedicated embedded processor . . . to monitor pressure inside four (4) hydraulic jacks associated with the MRS [mobile roof support]. Loading is proportional to the internal pressure and the surface area of the piston head of hydraulic cylinder and is determined by the formula:

$$F = A \times P$$

where F = force in pounds, A = area, in², and P=pressure, psi. The embedded processor reads changes in cylinder pressure through four multiplexed data acquisition channels of the load rate monitoring controller 24, and converts these pressure changes to load rates which are then displayed by the three load rate indicators, herein LED clusters . . .

A Perry-Stafford-Fisher-Stankus combination does not teach or suggest “the plurality of sensory indicators located in the vicinity of said at least one load sensing device indicate loading rate for the mobile roof support unit on a real-time basis during mining operations as determined via the pressure change information for the one or more hydraulic support systems of the mobile roof support machine.” The Office Action relies on Perry for various claim language, and then relies on Stafford for various aspects related to mobile roof support units. The Action then turns to Fisher and Stankus for real-time analysis.

Applicants respectfully disagree that the cited references contain sufficient disclosure that would teach or suggest the recited arrangement that involves novel and non-obvious mobile roof support unit technology. Further, Applicants believe the Action engages in improper hindsight when cobbling together the four references in the obviousness rejection; the references lack sufficient motivation for combination to result in the claimed arrangement.

In the interest of expediting prosecution, Applicants have now added language reciting that loading rate is indicated “on a real-time basis during mining operations as determined via the pressure change information for the one or more hydraulic support systems of the mobile roof support machine.” Although Stafford does describe a movable or “walking” mine roof support at column 1, lines 11 et seq. and further describes hydraulic fluid under pressure at column 6, line 44, Stafford clearly lacks a description of indicating loading rate “as determined via the pressure change information for the one or more hydraulic support systems of the mobile roof support machine.” Instead, at column 4, lines 13 et seq., Stafford describes “A major portion of each elongated member is fabricated of reinforced fiberglass . . .” And, at column 4, lines 21 et seq., Stafford describes “The elongated member when deflected to a preselected position provides a warning that the elongated member is approaching the elastic limit prior to failure of the elongated member under a weight of the mine roof.” Stafford thus teaches relying on fiberglass technology for providing a warning, rather than the recited “pressure change information for the one or more hydraulic support systems.”

Fisher and Perry do not mention hydraulic support systems, so they cannot contribute meaningful disclosure that would lead to the claimed arrangement. Stankus briefly mentions hydraulic props at column 7, lines 66-67, but also does not contribute meaningful disclosure that would lead to the claimed arrangement. Accordingly, claim 1 is allowable over a Perry-Stafford-Fisher-Stankus combination.

Further, Applicants wish to point out that the claim is not directed to hydraulic support systems *per se* or mere hydraulic support systems on a mobile roof support system, but a novel and non-obvious combination that involves hydraulic support systems of a mobile roof support machine, but also indicating “loading rate on a real-time basis during mining operations as determined via the pressure change information for the one or more hydraulic support systems of the mobile roof support machine.” Still further, the recited arrangement does not merely involve hydraulic pressure, but recites indicating loading *rate*, and is therefore well beyond what is taught or suggested by the combination of references.

For at least these reasons, Applicants believe that claim 1 and its dependent claims, 2-3, 6-11, 25-26, 30, 35-42, and 39, are in condition for allowance.

Claim 12

Claim 12 recites in part “means for determining the loading rate on the support systems using the received hydraulic pressure information.” Claim 12 and its dependent claims, 13-14, 22, 27-28, 31, 37, and 43, are therefore in condition for allowance.

Claim 15

Claim 15 recites in part, “real-time dynamic loading rate indications as determined via the hydraulic pressure information.” Claim 15 and its dependent claims, 16-20, 23, 29, and 32, are therefore in condition for allowance.

Claim 21

Claim 21 recites in part, “indicates loading rate on a real-time basis during mining operations as determined via the pressure information for the one or more hydraulic support systems of the mobile roof support machine.” Claim 21 and its dependent claim, 33, are therefore in condition for allowance.

Claim 24

Claim 24 has been amended to remove reference to mobile roof support and now recites in part, “alert workers of the dynamic loading rate conditions on the support systems of the unit on a real-time basis as determined via the monitored pressure inside the one or more hydraulic jacks associated with the unit.” Claim 24 and its dependent claim, 34, are therefore in condition for allowance.

Patentability of Claims over Perry-Stafford-Fisher-Stankus-Scott under § 103

The Action rejects claims 9-10, 14, 18, 20, 26, 28, 39, 40, and 44 under 35 U.S.C. § 103(a) as being unpatentable over Perry in view of Stafford, Fisher, Stankus, and Scott.

Without delving into the details of Scott, Applicants point out that Scott does not describe hydraulics and thus does not add sufficient disclosure to Perry, Stafford, Fisher, and Stankus to support a § 103 rejection of claims 1, 12, or 15, from which the claims depend, directly or indirectly.

Therefore, the combinations recited by claims 9-10, 14, 18, 20, 26, 28, 39, 40, and 44, are not taught or suggested by a Perry-Stafford-Fisher-Stankus-Scott combination. For at least these reasons, the claims are in condition for allowance.

Patentability of Claims over Perry-Stafford-Fisher-Stankus-Marion under § 103

The Action rejects claims 41 and 42 under 35 U.S.C. § 103(a) as being unpatentable over Perry in view of Stafford, Fisher, Stankus, and Marion.

Applicants note that Marion does describe hydraulic jacks, but fails to describe “via the pressure change information” as recited in claim 1, from which claims 41 and 42 depend. Marion thus fails to contribute sufficient disclosure for a § 103 rejection of claim 1. Claim 1 is therefore allowable over a Perry-Stafford-Fisher-Stankus-Marion combination, and so are claim 1’s dependent claims 41 and 42.

Patentability of Claims over Perry-Stafford-Fisher-Stankus-Marion under § 103

The Action rejects claim 45 under 35 U.S.C. § 103(a) as being unpatentable over Perry in view of Stafford, Fisher, Stankus, and Marion.

Claim 45 now recites “warning indications of the loading rate on the hydraulic-jack-based support systems of the mobile roof support unit based on the measurements of the hydraulic pressure within the one or more hydraulic jacks.” As understood by applicants, Marion does not add sufficient disclosure or motivation to a Perry-Stafford-Fisher-Stankus combination to result in the claimed arrangement.

Therefore, claim 45 is allowable over a combination of the five references.

Request for Interview

If any issues remain, the Examiner is formally requested to contact the undersigned attorney prior to issuance of the next Office Action in order to arrange a telephonic interview. It is believed that a brief discussion of the merits of the present application may expedite prosecution. Applicants submit the foregoing formal Amendment so that the Examiner may fully evaluate Applicants’ position, thereby enabling the interview to be more focused.

This request is being submitted under MPEP § 713.01, which indicates that an interview may be arranged in advance by a written request.

Conclusion

The claims in their present form should now be allowable. Such action is respectfully requested.

Respectfully submitted,

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